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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,776	07/31/2003	Yoshitsugu Goto	241075US0	7889

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EXAMINER	
ALHIJA, SAIF A	

ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 11/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/630,776	GOTO ET AL.	
	Examiner	Art Unit	
	Saif A. Alhija	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 September 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-7 have been presented for examination.

Claim 8 has been cancelled.

Response to Arguments

2. Applicant's arguments filed 13 September 2006 have been fully considered but they are not persuasive.

i) Following Applicants amendment the Claim Objections as well as the 101 and 112 2nd rejections have been withdrawn.

ii) Applicant argues that Stubbs teaches opposite correlating actual data to theoretical data. However, Stubbs is directed to a step forward in the art by not explicitly requiring the correlation. In addition, Stubbs discusses utilizing theoretical models as an approach as can be seen in Column 9, Lines 47-63 as well as Column 25, Lines 44-59. The citation of Column 35, Lines 11-34 was provided to show the teaching by the Stubbs reference of a comparison of theoretical and actual data.

iii) Applicant argues that Stubbs does not utilize natural or resonance frequencies with respect to calculated mode vectors. However as can be seen in Column 2, Line 51 – Column 3, Line 32 as well as Column 4, Lines 29-59, for example, frequencies are utilized following calculations and modal analysis.

iv) Following Applicants amendment an additional prior art rejection has also been provided below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-7 are rejected** under 35 U.S.C. 102(b) as being clearly anticipated by **Stubbs "Apparatus and Method for Damage Detection", U.S. Patent No. 5,327,358** hereafter referred to as **Stubbs.**

4. **Claims 1-7 are rejected** under 35 U.S.C. 102(b) as being clearly anticipated by **Liu "System Implementation, Modeling, and Defects Pattern Recognition for Flip Chip Solder Joint Inspection using Laser Techniques", hereafter referred to as Liu.**

Regarding Claim 1:

The reference discloses A computer implemented method of identifying a boundary condition between components of an object subjected to finite-element analysis, said object including a plurality of components, and having a plurality of elements positioned between the plurality of components, the method comprising the steps of:

calculating in an arithmetic device

a plurality of calculated mode vectors, and

natural frequencies or resonance frequencies of a plurality of components of the object said calculating step including executing a computer implemented finite-element method model of the object to indicate a boundary condition between the plurality of components of the object; **(Stubbs. Column 2, Line 51 – Column 3, Line 32. Column 4, Lines 29-59. Column 5, Lines 30-35. Column 25, Lines 44-59. Column 9, Lines 47-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)**

extracting an extracted calculated mode vector of the plurality of calculated mode vectors having a degree of correlation at or above a predetermined threshold, said degree of correlation being relative to an experimental mode vector obtained in an experiment; **(Stubbs. Column 2, Line 51 – Column 3, Line 32. Column 4, Lines 29-59. Column 5, Lines 30-35. Column 25, Lines 44-59. Column 9, Lines 47-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)** and

identifying the boundary condition of the elements based on the extracted calculated mode vector and the natural frequency or the resonance frequency corresponding to the extracted calculated mode vector. **(Stubbs. Column 2, Line 51 – Column 3, Line 32. Column 4, Lines 29-59. Column 5, Lines 30-35. Column 25, Lines 44-59. Column 9, Lines 47-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)**

Regarding Claim 2:

The reference discloses The method according to claim 1, wherein the step of extracting the includes the steps of:

determining the degree of correlation at least one time by residual degrees of freedom when n degrees of freedom giving a largest degree of correlation are eliminated from arithmetic operation **(Stubbs. Column 2, Line 51 – Column 3, Line 32. Column 4, Lines 29-59. Column 5, Lines 30-35. Column 25, Lines 44-59. Column 9, Lines 47-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)** and

extracting the extracted calculated mode vector when the degree of correlation exceeds the predetermined threshold. **(Stubbs. Column 2, Line 51 – Column 3, Line 32. Column 4, Lines 29-59. Column 5, Lines 30-35. Column 25, Lines 44-59. Column 9, Lines 47-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)**

Regarding Claim 3:

The reference discloses the method according to claim 1, wherein the step of calculating includes

defining a plurality of conditions for each of the elements and a plurality of levels for each of the plurality of conditions; and

calculating the natural frequencies or the resonance frequencies of the finite-element method models and the calculated mode vectors by adopting an experimental design. **(Stubbs. Column 22, Lines 18-24, 57-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)**

Regarding Claim 4:

The reference discloses the method according to claim 1, wherein a mode reducing model of a single component in which the mode vector up to a necessary frequency band is adopted is used as the component of the finite-element method model. **(Stubbs. Column 2, Line 40 – Column 3, Line 32. Column 22, Lines 18-24, 57-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)**

Regarding Claim 5:

The reference discloses the method according to claim 1, wherein the step of identifying the boundary condition comprising the steps of:

performing an arithmetic operation for an evaluation value indicating an error between the experiment and the calculation for each of a plurality of conditions based on the extracted, calculated mode vector and the natural frequency or the resonance frequency corresponding to the

extracted, calculated mode vector; **(Stubbs. Column 2, Line 40 – Column 3, Line 32) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)** and

identifying the boundary condition of the elements so that the evaluation value is minimized. **(Stubbs. Column 2, Line 40 – Column 3, Line 32) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)**

Regarding Claim 6:

The reference discloses the method according to claim 1, wherein the step of identifying the boundary condition comprising the steps of:

identifying the boundary condition between the components by using a spring between the components as an element contained in the finite-element method models to identify a spring constant of the spring between the components. **(Stubbs. Column 15, Line 49-Column 16, Line 10) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)**

Regarding Claim 7:

The reference discloses A computer program product embodied on a computer-readable recording medium, comprising code, when executed causes a computer to perform steps comprising:

calculating in an arithmetic device

a plurality of calculated mode vectors, and

natural frequencies or resonance frequencies of a plurality of components of the object said calculating step including

executing a computer implemented finite-element method model on the obiect to indicate a boundary condition between the plurality of components of the object; **(Stubbs. Column 2, Line 51 – Column 3, Line 32. Column 4, Lines 29-59. Column 5, Lines 30-35. Column 25,**

Lines 44-59. Column 9, Lines 47-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)

extracting an extracted, calculated mode vector of the plurality of calculated mode vectors having a degree of correlation at or above a predetermined threshold, said degree of correlation being relative to an experimental mode vector obtained in an experiment; **(Stubbs. Column 2, Line 51 – Column 3, Line 32. Column 4, Lines 29-59. Column 5, Lines 30-35. Column 25, Lines 44-59. Column 9, Lines 47-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)** and

identifying the boundary condition of the elements based on the extracted, calculated mode vector and the natural frequency or the resonance frequency corresponding to the extracted, calculated mode vector. **(Stubbs. Column 2, Line 51 – Column 3, Line 32. Column 4, Lines 29-59. Column 5, Lines 30-35. Column 25, Lines 44-59. Column 9, Lines 47-63) (Liu. Page 81-106, MODELING BASED ON VIBRATION MODAL ANALYSIS)**

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. All Claims are rejected.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saif A. Alhija whose telephone number is (571) 272-8635. The examiner can normally be reached on M-F, 11:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-22792279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAA

November 12, 2006

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